



TETRA TECH

September 1, 2015

Ms. Susan Fisher
On-Scene Coordinator
U.S. Environmental Protection Agency – TLC
8600 NE Underground Drive, Pillar 253
Kansas City, Missouri 64161


**Subject: Quality Assurance Project Plan for a Removal Assessment
PCE Chestnut Street Site, Atlantic, Iowa
U.S. EPA Region 7, START 4, Contract No. EP-S7-13-06, Task Order No. 0102
Task Monitor: Susan Fisher, EPA On-Scene Coordinator**

Dear Ms. Fisher:

Tetra Tech, Inc. (Tetra Tech) is submitting the attached Quality Assurance Project Plan (QAPP) for the PCE Chestnut Street site in Atlantic, Iowa. If you have any questions or comments, please call me at (816) 412-1937.

Sincerely,

for 
Jeff Pritchard, CHMM
START Project Manager


START Program Manager

Enclosures

cc  START Project Officer (cover letter only)



40499202

X9025.16.0102.000

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QUALITY ASSURANCE PROJECT PLAN
REMOVAL ASSESSMENT AT THE PCE CHESTNUT STREET SITE
ATLANTIC, IOWA

Superfund Technical Assessment and Response Team (START) 4 Contract
Contract No. EP-S7-13-06, Task Order 0102

Prepared For:

U.S. Environmental Protection Agency
Region 7
Superfund Division
11201 Renner Boulevard
Lenexa, Kansas 66219

September 1, 2015

Prepared By:

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**Region 7 Superfund Program
Addendum to the Generic QAPP for Superfund Site Assessment and Targeted Brownfields Assessment Activities (October 2012)
for the PCE Chestnut Street Site**

Project Information:

Site Name: PCE Chestnut Street Site		City: Atlantic	State: Iowa
EPA Project Manager: Susan Fisher		START Project Manager: Jeff Pritchard	
Approved By:		Prepared For: EPA Region 7 Superfund Division	
Title:	for START Project Manager		
Approved By:		Prepared By: Jeff Pritchard Date: August 2015	
Title:	START Program Manager		
Approved By:		Tetra Tech START Project Number: X9025.16.0102.000	
Title:	START QA Manager		
Approved By:			
Title:	EPA Project Manager		
Approved By:			
Title:	EPA QA Manager		

1.0 Project Management:

1.1 Distribution List:

EPA—Region 7: Susan Fisher, On-Scene Coordinator START: Jeff Pritchard, Project Manager
Diane Harris, Region 7 QA Manager [REDACTED] QA Manager

1.2 Project/Task Organization:

Susan Fisher, of the EPA Region 7 Superfund Division, will serve as the EPA Project Manager for the activities described in this QAPP. Jeff Pritchard, of [REDACTED] (a team subcontractor of Tetra Tech, Inc.), will serve as the START Project Manager.

1.3 Problem Definition/Background:

Description: This site-specific Quality Assurance Project Plan form is prepared as an addendum to the Generic Quality Assurance Project Plan for Superfund Site Assessment and Targeted Brownfields Assessment Programs (updated October 2012) and contains site-specific data quality objectives for the sampling activities described herein.

☒ Description attached.

☐ Description in referenced report: _____
Title Date

1.4 Project/Task Description:

☐ CERCLA PA ☐ CERCLA SI ☐ Brownfields Assessment
☐ Other (description attached) ☐ Pre-CERCLIS Site Screening ☒ Removal Assessment

Schedule: Field work is anticipated to occur in October 2015.

☐ Description in referenced report: _____
Title Date

1.5 Quality Objectives and Criteria for Measurement Data:

Accuracy:	<input checked="" type="checkbox"/> Identified in attached table.
Precision:	<input checked="" type="checkbox"/> Identified in attached table.
Representativeness:	<input checked="" type="checkbox"/> Identified in attached table.
Completeness*:	<input checked="" type="checkbox"/> Identified in attached table.
Comparability:	<input checked="" type="checkbox"/> Identified in attached table.

Other Description:

*A completeness goal of 100 percent has been established for this project. However, if the completeness goal is not met, EPA may still be able to make site decisions based on any or all of the remaining validated data.

1.6 Special Training/Certification Requirements:

☒ OSHA 1910

☒ Special Equipment/Instrument Operator: Sampling personnel will be experienced in Geoprobe® operation and in collection of groundwater samples. Geoprobe operation will be conducted by a licensed subcontractor.

☐ Other (describe below):

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1.7 Documentation and Records:

- ☒ Field Sheets ☒ Site Log ☐ Trip Report ☒ Site Maps ☐ Video
☒ Chain of Custody ☒ Health and Safety Plan ☒ Letter Report ☒ Photos
☒ Sample documentation will follow EPA Region 7 SOP 2420.05.
☒ Other: Analytical information will be handled according to procedures identified in Table 2.

2.0 Measurement and Data Acquisition:

2.1 Sampling Process Design:

- ☐ Random Sampling ☐ Transect Sampling ☒ Biased/Judgmental Sampling ☐ Stratified Random Sampling
☐ Search Sampling ☐ Systematic Grid ☐ Systematic Random Sampling ☐ Definitive Sampling
☐ Screening w/o Definitive Confirmation ☒ Screening w/ Definitive Confirmation
☒ Sample Map Attached

The proposed sampling scheme for this project will incorporate a combination of biased and judgmental sampling and field screening with definitive laboratory analysis, in accordance with procedures included in the *Guidance for Performing Site Inspections under CERCLA*, Office of Solid Waste and Emergency Response (OSWER) Directive #9345.1-05, September 1992. Judgmental sampling is the subjective (biased) selection of sampling locations based on historical information, visual inspection, and the best professional judgment of the samplers. Groundwater samples will be analyzed on site by the EPA Region 7 mobile laboratory. A portion of the groundwater samples will also be analyzed by the EPA Region 7 laboratory for verification. See Appendices A and B for additional site-specific information and maps. The proposed number of samples was determined by the EPA Project Manager and represents a reasonable attempt to meet the study objectives while staying within the budget constraints of a typical site investigation.

Sample Summary Location	Matrix	# of Samples*	Analysis
Geoprobe® temporary wells	Groundwater	Up to 140	VOCs (via EPA Region 7's mobile laboratory)
Geoprobe® temporary wells	Groundwater	30	VOCs (at EPA Region 7 fixed laboratory)

*NOTE: QC samples are not included with this total. See Table 1 for a complete sample summary.

2.2 Sample Methods Requirements:

Matrix	Sampling Method	EPA SOP(s)/Methods
Groundwater	At the Geoprobe® temporary wells, groundwater samples will be collected through polyethylene tubing fitted with a check valve that will be inserted into a Screen Point 15 sampling apparatus containing a stainless steel screen.	SOPs 4230.07 & 4231.2007

2.3 Sample Handling and Custody Requirements:

- ☒ Samples will be packaged and preserved in accordance with procedures defined in Region 7 EPA SOP 2420.06.
☒ COC will be maintained as directed by Region 7 EPA SOP 2420.04.
☒ Samples will be accepted according to Region 7 EPA SOP 2420.01.
☐ Other (Describe):

2.4 Analytical Methods Requirements:

- ☒ Identified in attached table.
☒ Rationale: The requested analyses have been selected based on the historical information on the site and program experience with similar types of sites.
☐ Other (Describe):

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2.5 Quality Control Requirements:

- ☐ Not Applicable
- ☒ Identified in attached table.
- ☒ In accordance with the Generic Quality Assurance Project Plan for Superfund Site Assessment and Targeted Brownfields Assessment Programs (updated October 2012).
- ☒ Describe Field QC Samples: For this investigation, field QC samples will include one equipment rinsate blank (water), one water trip blank, and one water field blank. The equipment rinsate will evaluate effectiveness of decontamination procedures for Geoprobe® sampling equipment. The trip blank will be used to assess transportation-related contamination. The field blank will be collected to evaluate contamination of sampling containers and/or preservatives, and to assess contamination potentially introduced during sampling and laboratory procedure(s). The blank samples will be submitted for the analyses listed in the attached tables. Analytical results from blank samples will be evaluated qualitatively by the EPA Project Manager and EPA contractor to determine a general indication of contamination potentially introduced in the field or laboratory. No field duplicate samples will be collected, because determination of total method precision is not required for this project.
- ☐ Other (Describe):

2.6 Instrument/Equipment Testing, Inspection, and Maintenance Requirements:

- ☐ Not Applicable
- ☒ In accordance with the Generic Quality Assurance Project Plan for Superfund Site Assessment and Targeted Brownfields Assessment Programs (updated October 2012).
- ☒ Other (Describe): Testing, inspection, and maintenance of field instruments will comply with manufacturers' recommendations. Testing, inspection, and maintenance of analytical instrumentation will comply with the previously referenced SOPs and manufacturers' recommendations.

2.7 Instrument Calibration and Frequency:

- ☐ Not Applicable
- ☒ Inspection/acceptance requirements accord with the Generic Quality Assurance Project Plan for Superfund Site Assessment and Targeted Brownfields Assessment Programs (updated October 2012).
- ☒ Calibration of laboratory equipment will occur as described in the previously referenced SOPs and/or manufacturers' recommendations.
- ☒ Other (Describe): Calibration of field instruments will be performed in accordance with the manufacturers' recommendations.

2.8 Inspection/Acceptance Requirements for Supplies and Consumables:

- ☐ Not Applicable
- ☒ In accordance with the Generic Quality Assurance Project Plan for Superfund Site Assessment and Targeted Brownfields Assessment Programs (updated October 2012).
- ☒ All sample containers will meet EPA criteria for cleaning procedures for low-level chemical analysis. Sample containers will have Level II certifications provided by the manufacturer in accordance with pre-cleaning criteria established by EPA in *Specifications and Guidelines for Obtaining Contaminant-Free Containers*.
- ☐ Other (Describe):

2.9 Data Acquisition Requirements:

- ☐ Not Applicable
- ☒ In accordance with the Generic Quality Assurance Project Plan for Superfund Site Assessment and Targeted Brownfields Assessment Programs (updated October 2012).
- ☒ Previous data/information pertaining to the site (including other analytical data, reports, photos, and maps, which are referenced in this QAPP) have been compiled by EPA and/or its contractor(s) from other sources. Some of that data have not been verified by EPA and/or its contractor(s); however, the information will not be used for decision-making purposes by EPA without verification by an independent professional qualified to verify such data and information.
- ☐ Other (Describe):

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2.10 Data Management:

- ☒ All laboratory data acquired will be managed in accordance with Region 7 EPA SOP 2410.01.
- ☐ Other (Describe):

3.0 Assessment and Oversight:

3.1 Assessment and Response Actions:

- ☒ Peer Review ☒ Management Review ☐ Field Audit ☐ Lab Audit
- ☒ Assessment and response actions pertaining to analytical phases of the project are addressed in Region 7 EPA SOPs 2430.06 and 2430.12.
- ☐ Other (Describe):

3.1A Corrective Action:

- ☒ Corrective actions will be taken at the discretion of the EPA Project Manager whenever there appear to be problems that could adversely affect data quality and/or resulting decisions affecting future response actions pertaining to the site.
- ☐ Other (Describe):

3.2 Reports to Management:

- ☐ Audit Report ☐ Data Validation Report ☐ Project Status Report ☐ None Required
- ☒ A letter report describing the sampling techniques, locations, problems encountered (with resolutions to those problems), and interpretation of analytical results will be prepared by Tetra Tech START and submitted to the EPA.
- ☒ Reports will be prepared in accordance with the Generic Quality Assurance Project Plan for Superfund Site Assessment and Targeted Brownfields Assessment Programs (updated October 2012).
- ☐ Other (Describe):

4.0 Data Validation and Usability:

4.1 Data Review, Validation, and Verification Requirements:

- ☐ Identified in attached table.
- ☒ Data review and verification will accord with the Generic Quality Assurance Project Plan for Superfund Integrated Assessment and Targeted Brownfields Assessment Program (updated October 2012).
- ☒ Data review and verification will be performed by a qualified analyst and the laboratory's section manager as described in Region 7 EPA SOPs 2430.06, 2430.12, and 2410.10.
- ☐ Other (Describe):

4.2 Validation and Verification Methods:

- ☐ Identified in attached table.
- ☒ The data will be validated in accordance with Region 7 EPA SOPs 2430.06, 2430.12, and 2410.10.
- ☒ The EPA Project Manager will inspect the data to provide a final review. The EPA Project Manager will review the data, if applicable, from laboratory spikes and duplicates, laboratory blanks, and field QC samples to ensure the data are acceptable. The EPA Project Manager will also compare the sample descriptions with the field sheets for consistency, and will ensure appropriate documentation of any anomalies in the data.
- ☐ Other (Describe):

4.3 Reconciliation with User Requirements:

- ☐ Identified in attached table:
- ☒ If data quality indicators do not meet the project's requirements as outlined in this QAPP, the data may be discarded, and re-sampling or re-analysis of the subject samples may be required by the EPA Project Manager.
- ☐ Other (Describe):

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Table 1: Sample Summary

Site Name: PCE Chestnut Street Site				Location: Atlantic, Iowa			
START Project Manager: Jeff Pritchard				Activity/ASR #: Not applicable		Date: August 2015	
No. of Samples	Matrix	Location	Purpose	Depth or other Descriptor	Requested Analysis	Sampling Method	Analytical Method/SOP
Up to 140	Groundwater	On-site Geoprobe® temporary wells	To identify source areas and extent of site-related contamination	35 borings, up to 4 depth intervals per boring location	VOCs	SOPs 4230.07 & 4231.2007	EPA SOP 2318.05
30	Groundwater	On-site Geoprobe® temporary wells	To verify mobile laboratory results	4-foot interval – To be determined	VOCs	SOPs 4230.07 & 4231.2007	EPA SOP 3230.13
QC Samples							
1	Water	Equipment rinsate blank	To evaluate effectiveness of decontamination procedures for Geoprobe® sampling equipment	Not applicable (N/A)	VOCs	N/A	EPA SOP 3230.13
1	Water	Field blank	To assess field/laboratory-related contamination	N/A	VOCs	N/A	EPA SOP 3230.13
1	Water	Trip blank	To assess transportation-related contamination	N/A	VOCs	N/A	EPA SOP 3230.13

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Table 2: Data Quality Objective Summary								
Site Name: PCE Chestnut Street Site				Location: Atlantic, Iowa				
START Project Manager: Jeff Pritchard				Activity/ASR #: Not applicable				Date: August 2015
Analysis	Analytical Method	Data Quality Measurements					Sample Handling Procedures	Data Management Procedures
		Accuracy	Precision	Representativeness	Completeness	Comparability		
Groundwater								
VOCs	See Table 1	Per analytical method	Per analytical method	Judgmental sampling based on professional judgment of the sampling team	100%; no critical samples have been identified	Standardized procedures for sample collection and analysis will be used.	See Section 2.3 of QAPP form.	See Section 2.10 of QAPP form.

APPENDIX A

SITE-SPECIFIC INFORMATION REGARDING GROUNDWATER SAMPLING FOR A REMOVAL ASSESSMENT AT THE PCE CHESTNUT STREET SITE

INTRODUCTION

The Tetra Tech, Inc. (Tetra Tech) Superfund Technical Assessment and Response Team (START) has been tasked by the U.S. Environmental Protection Agency (EPA) Region 7 Superfund Division under contract number EP-S7-13-06 to assist with a Removal Assessment at the PCE Chestnut Street site in Atlantic, Iowa. The site was identified during an investigation at the adjacent PCE Former Dry Cleaners site during March 2015, when analytical data from indoor air and sub-slab vapor samples collected within the downtown business district of Atlantic indicated elevated concentrations of tetrachloroethene (PCE) unrelated to the PCE Former Dry Cleaners site. Purposes of this Removal Assessment are to collect groundwater samples to identify source areas of the PCE contamination, and to define the extent of PCE contamination in groundwater. This investigation will proceed under authority of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) and the Superfund Amendments and Reauthorization Act of 1986 (SARA).

This Quality Assurance Project Plan (QAPP) identifies site-specific features and addresses elements of the sampling strategy and analytical methods proposed for the investigation.

SITE BACKGROUND INFORMATION

Information regarding the site's location, description, relevant investigation history, and geology and hydrogeology is discussed in this section.

Site Location/Description

Atlantic is a rural community in the northeastern portion of Cass County, Iowa, about 75 miles west of Des Moines, Iowa, and 45 miles northeast of Council Bluffs, Iowa. The PCE Chestnut Street site includes the downtown business district of Atlantic, Iowa (see Appendix B, Figure 1). Groundwater sampling conducted as part of this Removal Assessment will be within an investigation area shown on Figure 2 in Appendix B.

Previous Investigations

The PCE Chestnut Street site was discovered during vapor intrusion sampling at the adjacent PCE Former Dry Cleaners site in March 2015. During that sampling event, Tetra Tech collected sub-slab vapor and indoor air samples at residences and commercial buildings primarily downgradient of the suspected contaminant source of the PCE Former Dry Cleaners site (the former Norge Dry Cleaning Village [at 1205 East 7th Street]).

Included in the sampling event were commercial buildings at 315 and 319 Chestnut Street, approximately 1.0 mile west-northwest (cross-gradient) of the former Norge Dry Cleaning Village. Indoor air sample results from those buildings indicated PCE at concentrations above its Regional Screening Level (RSL) for industrial air of 47 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$). Groundwater flow at the site is generally to the north; therefore, contamination from the former Norge Dry Cleaning Village (associated with the PCE Former Dry Cleaner site) is not suspected to influence PCE concentrations identified at commercial buildings along Chestnut Street. The 315 Chestnut Street building, currently serving as a book store, is the former location of a dry cleaner. A review of historical documents and interviews with locals has indicated that three other dry cleaners were formerly in operation in the downtown area (along Chestnut and Poplar Streets). Those dry cleaners operated at 318 Chestnut Street, 500 Chestnut Street, and 410 Poplar Street. These former dry cleaners are potential sources of PCE (and trichloroethene [TCE], a degradation product of PCE) at the site.

Based on these sample results, EPA installed vapor mitigation systems at 315, 317, and 319 Chestnut Street. In July 2015, Removal Assessment sampling activities were conducted that included collection of the following samples: (1) indoor air samples for analysis of soil gas vapors near suspected source areas or overlying the PCE plume, and (2) sub-slab soil gas samples from beneath building foundations near suspected source areas or overlying the PCE plume.

Geology and Hydrogeology

The geologic stratigraphy in the site vicinity consists of Pleistocene alluvium, loess, and glacial drift deposits to an investigated depth of 50 feet (Tetra Tech EM Inc. 2004). Cretaceous Dakota Sandstone underlies the Pleistocene deposits, and Pennsylvanian-aged shale and limestone comprise the bedrock beneath the Dakota Sandstone.

Sources of groundwater in the site area include alluvial valley aquifers, glacial-drift aquifers, and the Dakota Formation (U.S. Geological Survey [USGS] 1992). The alluvial aquifers are primarily composed of deposits along existing river valleys. The alluvial valley nearest to Atlantic is the east fork of the Nishnabotna River and its tributary, Troublesome Creek. The alluvial aquifer underlying the valley is relatively shallow, at an average depth of 21 feet, and is composed of fine-grained deposits. Thickness of the aquifer ranges from approximately 2 to 43 feet. Groundwater can also be obtained from shallow glacial-drift aquifers consisting of glacial and loess deposits over bedrock. In the Atlantic area, these deposits range in thickness from 18 to 260 feet. Although the water table is usually shallow, production rates in the glacial-drift aquifers are often limited due to low soil permeability.

Atlantic Municipal Utilities (AMU) draws its water solely for public use from the Nishnabotna Member of the Dakota Formation. The Dakota is a fine- to coarse-grained sandstone, very poorly cemented (friable), partly pebbly to conglomeratic, and locally interbedded with seams of clay (Iowa Department of Natural Resources [IDNR] 1996). Secondary lithologies include chert-quartz gravel, conglomerate, and gray to variegated mudstone with some siderite pellets. The formation is approximately 40 to 60 feet thick in the Atlantic wellhead protection area, providing abundant pore space for groundwater storage. In the wellhead protection area, the Dakota is upwardly confined by clay-rich glacial till.

The Dakota aquifer is recharged by downward percolation through Pleistocene deposits and by lateral groundwater inflow from southwest Minnesota. Regional groundwater flow is from north to south, and natural discharge from the aquifer occurs into the lower reaches of major rivers in the region. Locally, groundwater flows from south to north (the direction of PCE migration), resulting from a combination of topography and groundwater pumping from the municipal well field.

Below the Dakota is an aquiclude of impermeable, calcareous, gray-blue-red shales, with interbedded limestones, belonging to the Missourian Series of Pennsylvanian age. These shales are encountered at 85 to 90 feet below ground surface (bgs) and are approximately 725 feet thick in the Atlantic area (Lockheed Martin Technology Service [Lockheed Martin] 2005).

SAMPLING STRATEGY AND METHODOLOGY

This activity will involve collection of groundwater samples. Groundwater samples will be collected to identify source areas of contamination contributing to the elevated levels of PCE previously detected in sub-slab soil gas and indoor air, and to define the extent of PCE contamination in groundwater. Sampling is scheduled to begin in early October 2015 and will require up to 7 days to complete. When applicable, the standard operating procedures (SOP) and chain-of-custody (COC) procedures referenced in this QAPP will be followed throughout the sampling activities to verify the integrity of the samples from time of collection until submittal for laboratory analysis. Disposal of investigation-derived wastes (IDW) and procedures for equipment and personal decontamination will be addressed in a site-specific health and safety plan prepared by Tetra Tech. Most IDW is expected to consist of disposable sampling supplies (tubing, gloves, and paper towels) that will be disposed of off site as uncontaminated solid waste. Descriptions of the sampling strategy and procedures follow.

Groundwater Sampling

Groundwater samples will be collected from approximately 35 Geoprobe® temporary wells that will be installed during site activities (see Appendix B, Figure 2). Temporary well locations have been selected to investigate potential contaminant source areas, as well as to delineate the extent of groundwater contamination. Sample locations are subject to change based on mobile laboratory results. Based on previous investigations in the site area, groundwater is anticipated to occur between 20 and 85 feet bgs. Up to four groundwater samples may be collected within discrete depth intervals at each temporary well location (resulting in a total of 140 samples). Collection of samples within multiple depth intervals will identify any downward contaminant migration. Groundwater samples collected from the temporary wells will be analyzed for volatile organic compounds (VOC) on site at a mobile laboratory. The mobile laboratory will be operated by EPA Region 7 personnel. Approximately 20 percent of the samples (30 samples) will be sent to the EPA Region 7 laboratory for confirmation analysis. Samples for confirmation analysis by the EPA Region 7 laboratory will be selected by the EPA and START Project Managers to represent the range of concentrations reported by the mobile laboratory.

Samples from temporary wells will be collected by use of a Geoprobe® Screen Point 15 groundwater sampling apparatus containing a 4-foot-long, reusable stainless steel screen. At each location, the sampler will be advanced into groundwater to the bottom of the boring; then the screen will be exposed to allow groundwater to enter the Screen Point 15 sampler. A sample will be collected through polyethylene tubing fitted with a check valve placed at the bottom of the tubing, which will be inserted into the Geoprobe® rod string. The rod string will then be raised for sample collection at the next desired (shallower) interval. Sample intervals will generally be 10 to 15 feet apart. At each sample interval, approximately 1 gallon of groundwater will be purged prior to sample collection. For the mobile laboratory, two unpreserved 40-milliliter volatile organic analyte (VOA) vials will be collected. Additionally, four 40-milliliter VOA vials preserved with hydrochloric acid (HCl) will be collected for possible confirmation analysis for VOCs by the EPA Region 7 laboratory.

A field sheet will be completed for each sample submitted for Region 7 laboratory analysis. The field sheet will include the following information: property ownership information, exact sample location (depth and global positioning system coordinates), and analyses to be performed. The groundwater sample vials will be labeled and stored in a cooler maintained at or below a temperature of 4 degrees Celsius pending submittal to the mobile laboratory or the EPA Region 7 laboratory.

The groundwater sampler and rods will be decontaminated following sampling at each well, and new tubing will be used at each well location. After sampling is completed, all boreholes will be plugged with bentonite from the bottom of the hole to the ground surface. Any disturbance to surface pavement will be patched with appropriate material to match the surrounding grade.

Quality Control Samples

To evaluate sample quality control (QC), one equipment rinsate blank (water), one field blank (water), and one trip blank (water) will be collected, as specified in Section 2.5 of the QAPP form. The blank samples will be submitted for analysis for VOCs.

To assess the decontamination procedures applied to Geoprobe® groundwater sampling equipment, the equipment rinsate sample will be collected during the course of field activities (as determined by the START Project Manager), following decontamination of the Geoprobe® Screen Point 15 groundwater sampler. Decontamination of the Geoprobe® samplers and rods will involve a tap water and Alconox wash and tap water rinse. Following decontamination, the equipment rinsate sample will be collected by pouring deionized water, supplied by the EPA Region 7 laboratory, through the groundwater sampling apparatus and into the appropriate sample containers.

The field blank sample will be collected during the sampling event to assess field- and laboratory-introduced contamination. The field blank sample will be prepared by START field sampling personnel by pouring deionized water, supplied by the EPA Region 7 laboratory, directly into the sample containers.

The water trip blank sample, prepared by the EPA Region 7 laboratory, will accompany and be submitted with the samples. The trip blank sample will assess whether any cross-contamination of samples occurred during sample shipment.

No field duplicates will be collected, because evaluation for total method precision will not be necessary for this project.

ANALYTICAL METHODS

All samples will be analyzed for VOCs at the on-site mobile laboratory operated by EPA Region 7 personnel. Approximately 20 percent of the samples will be submitted to the EPA Region 7 laboratory for confirmation analysis. Samples will be analyzed according to SOPs and methods referenced on the QAPP form. Standard turnaround times and detection limits for those methods will be adequate for this project. Appropriate containers and physical/chemical preservation techniques will be employed during

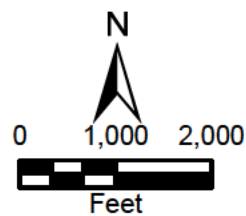
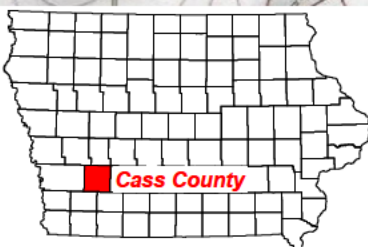
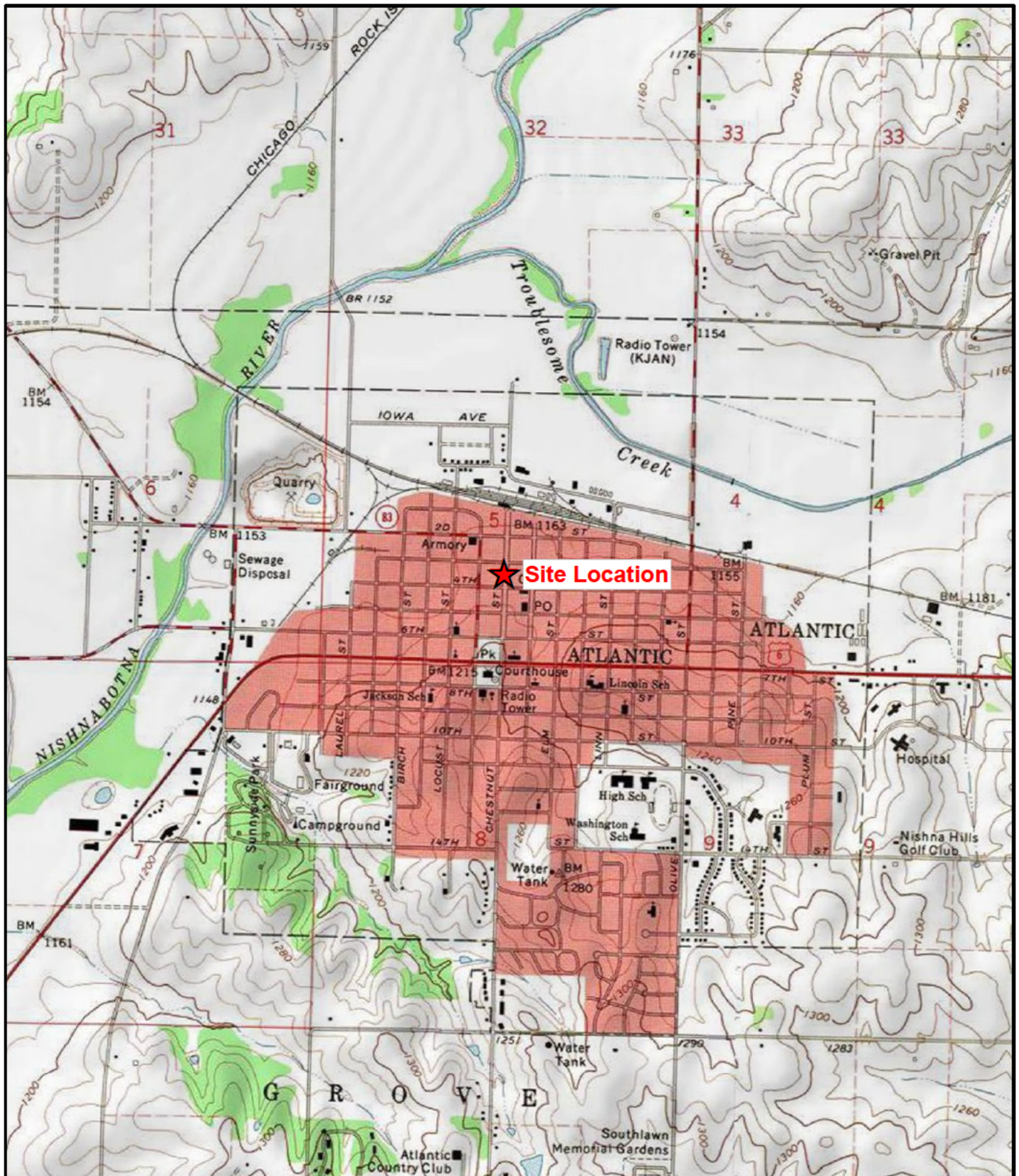
the field activities to help verify that representative analytical results are obtained. Submittal of samples to the laboratory is expected in October 2015.

REFERENCES

- Iowa Department of Natural Resources (IDNR). 1996. Mid-Cretaceous Fluvial Deposits of the Eastern Margin, Western Interior Basin: Nishnabotna Member, Dakota Formation. Geological Survey Bureau, Guidebook Series No. 17. May.
- Lockheed Martin Technology Service (Lockheed Martin). 2005. Hydrogeologic Investigation. Atlantic, Iowa, Groundwater PCE Site, Atlantic, Iowa. Work Assignment 0-136; Technical Memorandum. November 3.
- Tetra Tech EM Inc. 2004. Removal Site Evaluation Report, Atlantic Water Supply Site, Atlantic, Iowa. CERCLIS ID No. IAD039954300, Contract No. 68-S7-01-41, Task Order No. 0116. Superfund Technical Assessment and Response Team (START). Prepared for U.S. Environmental Protection Agency (EPA) Region 7. April 30.
- U.S. Geological Survey (USGS). 1992. Availability and Water Quality of Water from the Alluvial, Glacial-Drift, and Dakota Aquifers and Water Use in Southwest Iowa. USGS Water Resources Investigation Report 91-4156.

APPENDIX B

FIGURES



PCE Chestnut Street Site
Atlantic, Iowa

Figure 1
Site Location Map



Source: USGS Atlantic, Iowa 7.5 Minute Topo Quad, 1991
USGS Wiota, Iowa 7.5 Minute Topo Quad, 1971



Date: 8/25/2015

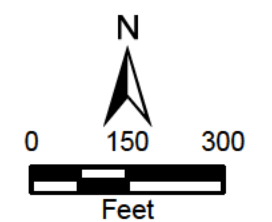
Drawn By: [Redacted]

Project No: X9025.16.0102.000

X:\9025\90102\90102\90102\Figure1.mxd



- Legend
-  Approximate groundwater investigation area boundary
 -  Former dry cleaner



Source: ESRI, ArcGIS Online, Bing Maps Hybrid, 2011

PCE Chestnut Street Site
Atlantic, Iowa

Figure 2
Groundwater Investigation Area

